

AIR QUALITY REPORT

BIG JACK EAST

PREPARED BY:

DATE:

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Background

The Big Jack East (BJE) Project area is located in northeastern Placer County, California, east of State Route 89 South, west of Martis Valley, and south of the Town of Truckee (see Map 1). In 2001, the Secretary of Agriculture identified Truckee as an Urban-Wildland Interface Community at High Risk from Wildfire (“Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire,” 66 Federal Register 3 (4 January 2001), pp. 751 - 777). The project area is largely surrounded by private property and it is the figurative backyard to hundreds of Truckee residents. The adjacent communities, including Sierra Meadows, Ponderosa Palisades, Martiswoods Estates, Ponderosa Ranchos and Martis Camp, plus a major utility corridor within the project area elevate the area’s need for effective management of the wildland urban intermix (WUI) consistent with management direction in the Forest Plan (*Tahoe National Forest Land and Resource Management Plan* (LRMP 1990) as amended by the *Sierra Nevada Forest Plan Amendment Record of Decision* (SNFPA 2004)).

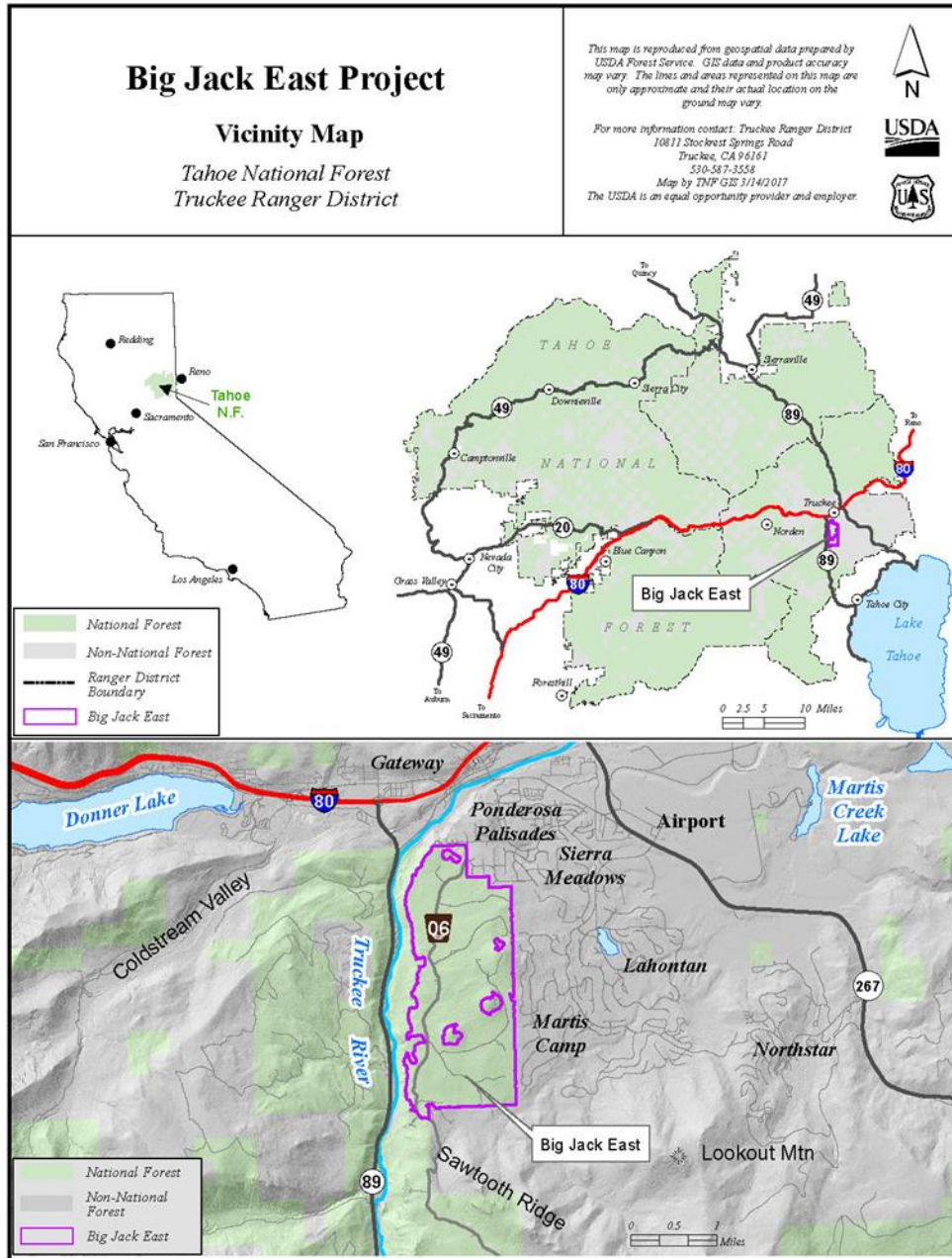
The Big Jack East Project area is located in northeastern Placer County, California, east of State Route 89 South, west of Martis Valley, and south of the Town of Truckee (See Map 1). It is located in portions of: T16N R16E Section 4; T17N R16E Sections 21, 22, 27, 28, 33, and 34.

Proposed Action

The Big Jack East Proposed Action proposes to remove vegetation on approximately 2,059 acres as shown on the map above. The following activities are proposed:

- Use of mechanical tools to implement treatments including mechanical thinning, grapple piling, and mastication totaling 1,816 acres
- Use of hand tools to implement thinning treatments totaling 108 acres
- Created openings (COs) on 52 acres
- Tree enhancements (TEs) on 15 acres
- Leave areas (LAs) retained on 68 acres
- Pile residual activity fuels and some naturally occurring surface fuels into burn piles by hand or machine inside treatment units, or move fuels to landings to be piled and burned, or removed as biomass. If vegetation is not removed as biomass then 1,816 acres of grapple piles or landing piles would be burned.
- Jackpot burn or underburn would be analyzed for on all treatment areas (up to 1,951 acres); however, it is likely that only a portion of the project would receive these treatments due to the difficulty of implementing this type of prescribed fire and the limited availability of burn windows
- Construct or re-open 0.5 miles of temporary roads. Temporary roads would be decommissioned following completion of vegetation management activities. Existing roads would be used wherever practicable.

Map 1 Big Jack East vicinity map



Affected Environment

The Big Jack East Project which will be referred to as BJE throughout the document is located in Placer County, California. Nearby towns, communities, and highways are shown in Table 1. Prescribed fire is one of the primary activities proposed for the BJE Project that would have a direct impact on air quality. Prescribed burning would be conducted during the fall, spring, or winter—the most favorable times in terms of smoke dispersion.

The entire project area is contained in the Placer County Air Pollution Control District (PCAPCD) within the Mountain Counties Air Basin. However this project is unique in that most air quality issues will affect the neighboring air quality management district, Northern Sierra Air Quality Management District (NSAQMD). Air quality in the context of this document refers to the amount and type of emissions contained in smoke produced by prescribed burning and wildfires. Particulate matter is of the greatest concern as particulate emissions in smoke and dust can affect both visibility and human health.

Air quality can be severely impacted by particulate matter and other pollutants during large wildfire events. Smoke impacts from the 2014 King Fire on the Eldorado and Tahoe National Forests affected air quality 30 miles away in Truckee, California. Fugitive dust caused by construction and use of unpaved roads can produce PM₁₀ in quantities great enough to impair the visual quality of the air. These effects are localized and can be mitigated by effective dust abatement methods. Dust generated by skidding, loading, and timber harvest activities also contributes to fugitive dust; however, the level contributed by these activities is unknown, but is not expected to be significant.

Table 1: Towns, communities and highways in the vicinity of the BJE Project

Town or Feature	Distance and Direction from BJE Project Boundary
Highway 89 South	Less than 1 mile west
Truckee	Less than 1 mile north
Sierra Meadows/Ponderosa Palisades	adjacent to the project boundary

Current Air Quality Conditions

In general, air quality in the northern Sierra Nevada, which includes the project area, is considerably better than in the southern Sierra Nevada. This is primarily due to the absence of high levels of fossil fuel combustion associated with metropolitan areas and because atmospheric conditions are not highly conducive to the formation and accumulation of ozone. The current attainment status for the counties relevant to the project is summarized in Table 2 below.

If the concentration of one or more criteria pollutants in a geographic area is found to exceed the regulated or 'threshold' level for one or more of the National Ambient Air Quality Standards (NAAQS) the area may be classified as a nonattainment area. Areas with concentrations of criteria pollutants that are below the levels established by the NAAQS are considered either attainment or unclassifiable areas.

Table 2: Current (2015) State and Federal Attainment Status¹

Criteria pollutant	County	State	Federal
Ozone (O ₃)	Nevada and Placer Counties	Nonattainment	Nonattainment
PM ₁₀	Nevada and Placer Counties	Nonattainment	Unclassified

PM2.5	Nevada and Placer Counties	Unclassified	Unclassified
Carbon Monoxide CO	Nevada and Placer Counties	Unclassified	Unclassified

¹Derived from 2015 Area Designations for State and Federal Ambient Air Quality Standards; Source Date: June 2015 Air Quality Data Branch PTSD; available at <http://www.arb.ca.gov/desig/adm/adm.htm>

Hazardous fuel reduction, through prescribed burning, is the most effective and cost efficient treatment available which directly affects fire behavior and suppression success. However; prescribed fire within the project area has caused smoke impacts to the Truckee area in the past. Therefore, other avenues of fuel removal will be considered.

Removing fuel in the form of biomass is the preferred method. Biomass has been used for generation of electric power at a cogeneration plant in Loyalton. However, this facility has been closed for several years and recently reopened. It is unclear if they will be able to utilize the biomass produced from this project which increases the amount of vegetation burned onsite. The District is also using more mechanical fuel treatment methods (such as grapple piling and mastication) to reduce the potential for air quality problems and provide more flexibility in burning of fuels at those times of the year when weather conditions allow for better smoke dispersal and dissolution.

Emissions of concern in the Big Jack East Project Area

Ozone (O₃) is the primary constituent of what is commonly referred to as smog. It is an oxidant that can irritate eyes, nose, throat and lungs and in relatively low concentrations can cause damage to vegetation. Ozone concentrations are typically quite low in the winter months but increase dramatically during the summer season. Ozone is classified as a secondary pollutant. This means that ozone is not directly emitted into the atmosphere by cars or factories but is produced by photochemical reactions between Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOC), referred to as "precursor pollutants". Ozone is a severe eye, nose, and throat irritant and increases susceptibility to respiratory infections.

Carbon monoxide CO is a colorless, odorless gas produced by incomplete combustion of wood or other organic materials. Carbon monoxide levels are highest during the smoldering stages of a fire, especially in very close proximity to the fire. Carbon monoxide is a poisonous gas but usually only reaches toxic levels above and adjacent to prescribed fires and wildland fires (McMahon and Ryan 1976).

Inhalable Particulate Matter (PM₁₀ and PM_{2.5}) are tiny subdivisions of solid matter suspended in the air. Sources of Particulate Matter can be man-made or natural. Naturally occurring PM₁₀ may originate from dust, wildfires or plant pollen. Human activities, such as the burning of fossil fuels in vehicles, prescribed fire and heavy traffic on dirt roads can also generate significant amounts of PM₁₀. Increased levels of fine

particles in the air are linked to health hazards such as heart disease, altered lung function and lung cancer.

The release of particulate matter into the air during prescribed burning can have adverse effects on visibility and public health. The volume of particulate matter is related to which burning method is used and the extent of the burning. Particulate concentrations in the Mountain Counties air basin are influenced by climatic conditions and other emission-generating activities carried out in the air basin. Particulate concentrations are regulated through compliance with the U.S. EPA, the California Air Resources Board and PCAPCD.

Analysis Framework: Statute, Regulatory Environment, Forest Plan and Other Direction

Regulatory Environment

Air quality is managed through a complex series of federal, state, and local laws and regulations. The U.S. Environmental Protection Agency (EPA) has the primary federal role of ensuring compliance with the requirements of the *Clean Air Act*. The EPA issues national air quality regulations, approves and oversees State Implementation Plans, and conducts major enforcement actions. State and local Air Pollution Control Districts (APCDs) and Air Quality Management District's (AQMDs) have the primary responsibility of carrying out the development and execution of State Implementation Plans, to attain and maintain the National Ambient Air Quality Standards (NAAQS) in all of the country and a specific plan to attain the standard for each designated nonattainment area for a NAAQS.

Activities that affect air quality in the project area are (1) prescribed burning on National Forest lands for reforestation, hazard reduction, and wildlife habitat improvement; (2) dust from construction, use of unpaved roads and harvest activities; (3) wildfire occurrence; and 4) hauling of logs and chips from the project area

Federal, State and Local Laws

Clean Air Act

The original *Air Quality Act* was passed in 1963. This act was followed by the *Clean Air Act* and its amendments of 1970, 1977, and 1990. The *Clean Air Act* is the primary legal instrument for air resource management. It requires the EPA to identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant. The Clean Air Act requires the U.S. EPA to set National Ambient Air Quality Standards for six common air pollutants: sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, and particulate matter (PM) that is 10 microns (PM10) in diameter or smaller. If the National Ambient Air Quality Standards are violated in an area, that area is designated as "nonattainment" for that pollutant, and the state must develop a plan for bringing that area back into "attainment."

The 1977 *Clean Air Act* amendments set up a process to designate Class I and Class II areas for air quality management. Class I areas receive the highest levels of protection under the Prevention of Significant

Deterioration program, which regulates air quality through application of criteria for specific pollutants and use of the Best Available Control Methods. Class I areas include international parks, national parks larger than 6,000 acres, and national wilderness areas larger than 5,000 acres.

The 1990 amendment of the *Clean Air Act* published the General Conformity Determination. It states that in federal nonattainment areas, before actions can be taken on federal lands that have the potential to emit pollutants to the atmosphere, a determination must be made that the emissions will not exceed a *de minimis* (threshold) level measured in tons per year. If the action exceeds the *de minimis* level, then a conformity determination is required to document how the federal action will not (1) cause or contribute to any new violation of any standard in any area; (2) increase the frequency or severity of any existing violation of any standard in any area; or (3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area. If the project emissions are below *de minimis* levels, the project would be considered exempt from conformity determination with the State Implementation Plan.

Forest Plan

Sierra Nevada Forest Plan Amendment: Final Supplemental Environmental Impact Statement Record of Decision: Forest wide Standards & Guidelines (2004)

On the Tahoe National Forest, the 1990 *Tahoe National Forest Land and Resource Management Plan* (also referred to as the “Forest Plan,” pages 3-13 and 14), the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) final supplemental EIS provide direction for coordination and cooperation with local Air Quality Management Districts.

The following operating procedures are from the SNFPA final EIS (2004):

1. Conduct prescribed burns when favorable smoke dispersal is forecasted, especially near sensitive Class I areas.
2. Use appropriate smoke modeling software to predict smoke dispersion.
3. Minimize smoke emissions by following Best Available Control Methods.
4. Avoid burning on high visitor use days and notify the public before burning.
5. Consider alternatives to burning.
6. Incorporate burn plan data into appropriate modeling software.
7. Comply with Title 17 of the 2004 California Air Pollution Control Laws and interim air quality policy and local smoke management programs.

Class 1 Prevention of Significant Deterioration (PSD) for Fine Particle Pollution– Increment Areas

Class 1 areas include all international areas and National Parks greater than 6000 acres, national wilderness areas greater than 5000 acres that existed on August 7, 1977. This class provides the most protection to pristine lands by severely limiting the amount of additional man-made air pollution, which can be added to these areas. The only Class 1 PSD area within 100 kilometers of the BJE Project site is the Desolation Wilderness which is about 35 miles to the south of the project area. Prevailing winds, local

topography, the limited volume of potential pollution outputs from dust and prescribed fire smoke from the BJE Project, and the distance from the project area would make any impact to this Class 1 area highly unlikely.

State and Local Regulations

Agricultural burning is the intentional use of fire for vegetation management in areas such as agricultural fields, orchards, rangelands, and forests, which includes prescribed burning. The California Health and Safety Code provides for agricultural burning to be reasonably regulated and not be prohibited. The California Air Resources Board and local air districts take into consideration, in the adoption of rules and regulations various factors including but not limited to the population in an area, the geographical characteristics, the meteorological conditions, and the economic and technical impact along with the importance of a viable agricultural economy in the state. Through the Health and Safety Code the adoption of agricultural regulations is through the California Code of Regulations (CCR) – Title 17, Smoke Management Guidelines for Agricultural and Prescribed Burning. <https://www.arb.ca.gov/regs/regs-17.htm>

Smoke Management Guidelines for Agricultural and Prescribed Burning contained in Title 17 of the California Code of Regulations

During the implementation of the BJE Project any required air quality coordination would take place between the Forest Service and the Placer County Air Pollution Control District. This air quality coordination would follow the Smoke Management Guidelines for Agricultural and Prescribed Burning contained in Title 17 of the CCR These Guidelines which are intended to provide for the continuation of agricultural burning, including prescribed burning, as a resource management tool, and provide increased opportunities for prescribed burning and agricultural burning, while minimizing smoke impacts on the public. Section 80160 of the CCR outlines the specific requirements for prescribed burning and prescribed fires in wildland and wildland/urban interface areas.

Local Regulations-Title 17 Section 80160:

Special Requirements for Prescribed Burning and Prescribed Fires in Wildland and Wildland/Urban Interface Areas. The district smoke management programs shall include rules and regulations or, until April 1, 2003, other enforceable mechanisms that:

- 1) Require registration of all planned burn projects annually or seasonally, including areas considered for potential naturally-ignited wildland fires managed for resource benefits, with updates as they occur.
- 2) Require the submittal of smoke management plans for all burn projects greater than 10 acres in size or estimated to produce more than 1 ton of particulate matter. Smoke management plans must contain, at a minimum, the following information:
 - a) Location, types, and amounts of material to be burned;
 - b) Expected duration of the fire from ignition to extinction;
 - c) Identification of responsible personnel, including telephone contacts; and
 - d) Identification and location of all smoke sensitive areas.

- 3) Require that smoke management plans for burn projects greater than 100 acres in size or estimated to produce more than 10 tons of particulate matter contain, at a minimum, the information contained in subsection (b) and the following additional information:
 - a) Identification of meteorological conditions necessary for burning.
 - b) The smoke management criteria the land manager or his/her designee will use for making burn ignition decisions.
 - c) Projections, including a map, of where the smoke from burns are expected to travel, both day and night.
 - d) Specific contingency actions (such as fire suppression or containment) that will be taken if smoke impacts occur or meteorological conditions deviate from those specified in the smoke management plan.
 - e) An evaluation of alternatives to burning considered; if an analysis of alternatives has been prepared as part of the environmental documentation required for the burn project pursuant to the National Environmental Policy Act (NEPA) or the California Environmental Quality Act (CEQA), as applicable, the analysis shall be attached to the smoke management plan in satisfaction of this requirement.
 - f) Discussion of public notification procedures.
- 4) If smoke may impact smoke sensitive areas, require smoke management plans to include appropriate monitoring, which may include visual monitoring, ambient particulate matter monitoring or other monitoring approved by the district, as required by the district for the following burn projects:
 - a) projects greater than 250 acres;
 - b) projects that will continue burning or producing smoke overnight;
 - c) projects conducted near smoke sensitive areas; or
 - d) as otherwise required by the district.
- 5) Require, as appropriate, daily coordination between the land manager or his/her designee and the air district or the ARB for multi-day burns which may impact smoke sensitive areas, to affirm that the burn project remains within the conditions specified in the smoke management plan, or whether contingency actions are necessary.
- 6) Alternate thresholds to those specified in sections (b), (c), and (d) may be specified by a district consistent with the intent of this section.
- 7) Require district review and approval of smoke management plans. Districts shall provide notice to the ARB of large or multi-day burns as specified in (d) or (e) and consult with the ARB on procedures for ARB review and approval of large or multi-day burns as specified in (d) and (e).
- 8) Require that when a natural ignition occurs on a no-burn day, the initial “go/no-go” decision to manage the fire for resource benefit will be a “no-go” unless:
 - a) After consultation with the district, the district decides, for smoke management purposes, that the burn can be managed for resource benefit; or
 - b) For periods of less than 24 hours, a reasonable effort has been made to contact the district, or if the district is not available, the ARB.
 - c) After 24 hours, the district has been contacted, or if the district is not available, the ARB has been contacted and concurs that the burn can be managed for resource benefit.

- d) A “no-go” decision does not necessarily mean that the fire must be extinguished, but that the fire cannot be considered as a prescribed fire.
- 9) Require submittal of smoke management plans within 72 hours of the start of the fire for naturally-ignited wildland fires managed for resource benefits that are expected to exceed 10 acres in size.
 - 10) Require the land manager or his/her designee conducting a prescribed burn to ensure that all conditions and requirements stated in the smoke management plan are met on the day of the burn event and prior to ignition.
 - 11) Require a post-burn smoke management evaluation by the burner for fires greater than 250 acres.
 - 12) Require procedures for public notification and education, including appropriate signage at burn sites, and for reporting of public smoke complaints.
 - 13) Require vegetation to be in a condition that will minimize the smoke emitted during combustion when feasible, considering fire safety and other factors.
 - 14) Require material to be burned to be piled where possible, unless good silvicultural practices or ecological goals dictate otherwise.
 - 15) Require piled material to be burned to be prepared so that it will burn with a minimum of smoke.
 - 16) Require the permit applicant to file with the district a statement from the Department of Fish and Game certifying that the burn is desirable and proper if the burn is to be done primarily for improvement of land for wildlife and game habitat. The Department of Fish and Game may specify the amount of brush treatment required, along with any other conditions it deems appropriate.

Assumptions, Methodology, Analysis Methods and Definitions

Assumptions

The following are the assumptions used for determining emissions from timber operations and prescribed burns:

- **Assumption 1:** All harvest thinning equipment will be diesel powered, and thinning treatments will occur over a five to ten-year period
- **Assumption 2:** Harvest operations include harvesting, processing, skidding, loading, hauling, and road watering
- **Assumption 3:** Slash piles are constructed free of dirt, with 90 percent consumption
- **Assumption 4:** Fuel is not removed as biomass

Table 3: BJE Project treatment assumptions and calculation parameters.

Prescribed fire treatment	Acres	Average number of piles per acre or tons per acre	Tons per pile	Total amount of biomass in tons
Hand Pile	108	15	0.18	291
*Grapple Pile	1,727	7	1.04	12,572
*Landing Pile	N/A	40 total	44.53	1,781
Underburn	1,951	5	N/A	9,755

* Note; if grapple piling is the chosen method within the units there will be no landing piles and if landing piling is the chosen method of treatment there will be no grapple piles. However there may be a combination of both depending on the contract. Also, if the material is removed as biomass there will not be any grapple or landing piles.

Methodology and Analysis Methods

The predicted emissions from wildfire and prescribed fire within the proposed project area have been estimated using two modeling programs described below. The Piled Fuels and Biomass Emissions Calculator was used to determine emissions from hand piles <http://depts.washington.edu/nwfire/piles/>. First Order Fire Effects Model (FOFEM) was used to determine emissions from underburning and wildfire emissions. Prescribed fire is estimated to be done over a period of five to ten years. Emission totals from harvest activities and timber operations were then calculated using the National Environmental Policy Act Air Quality Desk Reference Guide (CH2M Hill 1995; table 3.3.2-1 and pages 3.1.2-2 through 3.1.2-3).

Environmental Consequences of each Alternative

Alternative 1-Proposed Action-Direct and Indirect Effects

The amount of particulates is based on 108 acres proposed for hand piling, 1,727 acres of grapple piling, 1,951 acres of underburning/jackpot burning and a possibility of 40 landing piles. As noted above, if grapple piling is the chosen method then there will be no landing piles and vice versa. Also, if we remove the material as biomass then there will be no grapple or landing piles, only handpiles and underburning would remain as a treatment method. If grapple pile is the chosen method the likelihood of underburn or jackpot burning remains low. Removing the material as biomass is the preferred method of treatment. A total of 1,951 acres proposed for jackpot/underburn treatment were analyzed and the projected time to accomplish this type of prescribed fire would be approximately 10 years. If grapple pile method is chosen as a treatment then underburn or jackpot burn would not be needed. The prescribed fire would be done in the spring, fall, or winter months because these are the best times of year for dispersion. Each year the burning would take place over a period of months, with treated areas spread throughout the project area. Table 4 describes quantity and type of pollutants that would be emitted if Alternative 1 is selected.

Table 4: Total criteria pollutant emissions for prescribed fire and mobile emissions displayed tons

	Acres	PM10	PM2.5	CO	CO2	VOC	NOx
Hand pile burning	108	1.78	1.62	8.75	379	.65	.48
*Grapple pile burning	1,727	88.24	76.16	431.58	18,907	31.43	25.38
*Landing pile burning	40 piles	11.6	10.2	57.2	2520	4.24	3.4
*Underburn/Jackpot Burn	1,951	253	214	2,887	20,485	134	15.6
Mobile Emissions	N/A	0.40	N/A	4.60	N/A	1.02	14.93
Criteria pollutant totals		355	301	3,389	42,291	171	59

* Note; if grapple piling is the chosen method within the units there will be no landing piles and if landing piling is the chosen method of treatment there will be no grapple piles. However there may be a combination of both depending on the contract. Also, if the material is removed as biomass there will not be any grapple or landing piles. Removing the

material as biomass is the preferred method of treatment. If grapple pile/burn is the method that is chosen then an underburn may not be needed.

Prescribed burning and pile burning would be used to reduce both existing and activity-generated fuels. The objective of pile burning would be to reduce fuel loadings while protecting the residual overstory trees from damage caused by heat and flames. Pile burning could produce more particulate matter per acre than understory burning because the standing biomass would be cut and piled producing higher fuel loads. However, piled material is allowed to cure and can be ignited with lower fuel moistures, which ensures complete and efficient consumption and less particulate matter being produced.

If fuel loading does not meet the desired condition after the biomass reduction is complete than an understory burn is prescribed, this is predicted to produce fewer emissions than a wildfire of the same size because of the lighter fuel load. In the event of a wildfire, treated stands in the BJE project area would have less material to burn producing less particulate matter emissions than untreated areas outside the project area.

Mitigation Measures for Alternative 1

Proper mitigation measures to meet air quality requirements would be implemented by the BJE project. During the implementation of Alternative 1, the prescribed fire planner would coordinate with the Air Quality Coordinator at PCAPCD to design the smoke management plan. Burning permits would be acquired from the Placer County Air Pollution Control District. The Air Quality District would determine days when burning is allowed. The California Air Resources Board (CARB) provides daily information on “burn” or “no burn” conditions. Burn plans would be designed and all fuel reduction burning would be implemented in a way to minimize particulate emissions. Prescribed fire implementation would coordinate daily and seasonally with other burning permittees both inside and outside the forest boundary to help meet air quality standards. The local communities that might potentially be impacted by prescribed fire smoke from the BJE project are mainly within the Truckee area. Because of the mitigations measures applied, the coordination with CARB, and past learning experiences any impacts are expected to be minimal.

The prescribed burning proposed in Alternative 1 would be used to reduce fuel loadings to an acceptable level. Under favorable smoke-dispersal conditions, the smoke would likely affect air quality during ignition and for approximately one to three days following ignition. Another impact of Alternative 1 would be the emissions and dust caused by project activities. Fugitive dust caused by the use of unpaved roads can produce PM10 in quantities great enough to impair the visual quality of the air. These effects are localized and would be mitigated by adherence to dust abatement standard operating procedures. Emissions from burning and equipment used for other project activities (such as thinning) may be occurring at the same time, which would elevate particulate matter. By following the burn plan and Air Quality Management District requirements for burning and managing other project activities, it is unlikely that emissions caused by the project would exceed California Air Quality Standards for the Air Quality Management District.

The VOC, NO_x, and PM₁₀ emissions from the Alternative 1 would contribute to particulate matter loading locally. Local effects include cumulative emissions from prescribed burning resulting from past practices, natural surface fuel buildup, and activities on federal, state, and private lands near the BJE Project Area. The PM_{2.5} atmospheric concentrations currently do not exceed national standards; however, emissions could exceed California Air Resources Board (CARB) standards if (1) weather conditions predicted by CARB meteorologists do not prevail, or (2) emissions do not disperse as predicted, and/or (3) emissions from other Air Quality Management District's adversely impact air quality in local districts. Forest Service and CARB smoke-dispersal forecasting would be used as part of the burn plan to mitigate effects within the regulatory framework.

Moreover, Alternative 1 would reduce the level of hazardous forest fuels, and provide for a safer and more effective wildfire suppression environment. These actions would reduce the potential for large high intensity wildfire, and therefore reduce the potential for the large amount of smoke emissions associated with such wildfire. The adverse effects to air quality from a large wildfire would greatly exceed in both duration and quantity the smoke emissions from a limited amount of controlled, mitigated and State regulated smoke emissions from prescribed fire. The controlled use of prescribed fire in combination with the removal of forest material in the form of biomass and commercial sawlogs would result in a long-term improvement in air quality.

Control of Dust

Fugitive dust could be caused by the construction and reconstruction of roads, skidding of logs, and biomass material, hauling operations on native or aggregate surfaced roads, and road maintenance and repair activities. Dust abatement techniques would be applied as necessary to all these activities to minimize unsafe conditions and meet air quality requirements. Dust would be abated with the application of water to native soil or aggregate surfaces as needed during equipment operations and transportation activities. Because of the large size of the BJE project area, the amount and dispersed nature of dust producing activities, and the favorable weather conditions within the normal operating season, in combinations with the dust abatement techniques used, any adverse effects from dust are expected to be minimal.

Diesel Engine and other Motor Vehicle Emissions

The potential for adverse effects from emissions from diesel engines and other motor vehicle is low because of the relatively small number of vehicles from all forms of activities in a very large project area. It is a somewhat rural environment as it is not a city center, however the project is surrounded by several communities. Recreational activity, and forest management activities such as timber harvest is widely dispersed over both area and time on both National Forest and private land. In addition, the Federal and State requirements designed to protect and maintain air quality for diesel and other motor vehicle engines are applicable to all the equipment and recreations vehicles that operate within the project area. For all these reasons, any adverse effects from the exhaust associated with diesel and other motor vehicles is expected to be minimal to the point of non-significance.

Cumulatively, the dust and emissions from project activities would be mitigated by requiring that Standard Operating Procedures such as road watering be included with timber sale or service contract

packages. . (also need to comply with District rule 228 fugitive dust. You'll need to review - <http://www.placerair.org/~media/apc/documents/rules/reg%202/rule228fugitivedust.pdf?la=en>)

Alternative 2-No Action Alternative-Direct and Indirect Effects

Under this alternative, no increase in ozone precursors or PM10 emission levels would be produced from prescribed burning of activity-generated fuels, harvest operations, or understory burning. Alternative 2 would not result in a reduction of surface fuels, so the potential for substantial degradation of air quality from future wildfire would not be reduced. However, air quality can be severely impacted by particulate matter and other pollutants during large wildfire events which is what this project is trying to prevent. Impacts from the 2014 King Fire on the Eldorado and Tahoe National Forests affected air quality over 40 miles away. The King Fire made a 50,000 acre run in one burning period making air quality hazardous to sensitive groups for weeks. The No-action Alternative would not provide any opportunities for reducing existing forest fuels and the hazard they pose in wildland fires. During the flaming phase of a stand-replacing wildfire, air quality degradation can exceed federal and state standards hundreds of miles downwind. The potential ozone precursors from a wildfire are shown in Table 5.

Table 5: Potential ozone precursors and PM10 from wildfire emissions in tons

	Acres	PM10	PM2.5	CO	CO2	VOC	NOx
Wildfire	1,000	704	596	7,757	43,400	357	21
Wildfire	5,000	3,520	2,980	38,785	21,000	1,785	105

The Donner Ridge fire of 1960 burned over 44,000 acres in 4 days. A 44,000 acre fire could produce over 23,000 tons of PM10 and over 19,000 tons of PM2.5, all of which is emitted into the atmosphere in a few days. The King fire made a 50,000 acre run in one day; imagine the particulate matter emitted from a fire such as that. Prescribed burning allows us to choose the best days possible for air movement and only emits small amounts of pollutants at a time.

Cumulative Effects of each Alternative to Air Quality

Cumulative Effects of Alternative 1

The cumulative effects analysis for Air Quality considers ongoing, proposed and reasonably foreseeable future actions. Impacts to air quality from prescribed burning in the project area and adjacent areas during the last five years have been minimal and no Notice of Violation of air quality standards has been issued to the Tahoe National Forest during this period. The action alternatives would not increase the amount of prescribed fire activities in the area above what has been implemented for the last five years. Action alternatives would not impact air quality in the area when combined with ongoing and reasonably foreseeable future actions. However, the action alternatives would have cumulative effects on air quality in the project area and local air basin, but the effects would be managed to be within the regulatory standards of the California Air Resources Board. The dust and emissions from project activities would be

mitigated by requiring that Standard Operating Procedures be included with timber sale or service contract packages.

Cumulative Effects of Alternative 2

Under Alternative 2, the project area would be subjected to long-term deposition of surface fuels. Forest fuels would continue to increase with biomass production and would out-produce the decomposition rates in this climate. The long-term chronic effects of wildfires would be higher PM10 emissions, mostly due to large areas of exposed soil and ash in the aftermath of a high-intensity wildfire. Without considering the possibility of future wildfires, the No-action Alternative would have no cumulative effects on particulate matter and visibility.

Comparison of Alternatives

Alternative 1 conforms to the state clean air act. NOx emissions are not expected to exceed Placer or Nevada County's maximum emission standard of 25 tons per year. Alternative 1 estimates less than 11 tons of NOx per year. Alternative 1 is predicted to have a modest but overall positive effect on emissions potential under wildfire conditions. As shown in Table 6, Alternative 1 is estimated to produce a total of 17.2 tons of PM10 per year. The threshold for significance is 100 tons of PM10. When compared with Alternative 2 (No Action), the action alternatives would result in a reduction in the potential smoke emissions from wildfire from the acres proposed for thinning and fuel reduction treatment. Table 6 displays that a 2,000 acre wildfire would produce significantly more pollutants than if it was treated as described in Alternative 1. Further, a wildfire would release all emissions out at once, instead of delaying it over years as Alternative 1 would do.

Table 6: Comparison of total emission outputs for Alternative 1 treatments as compared to a 2,000 acre wildfire

	Acres	PM10	PM2.5	CO	CO2	VOC	NOx
Grapple Pile Burn	1,727	88.24	76.16	431.58	18,907	31.43	25.38
Landing Pile Burn	40 piles	11.6	10.2	57.2	2520	4.24	3.4
Hand Pile Burn	108	1.78	1.62	8.75	379	.65	.48
Jackpot/Underburn	1,951	253	214	2,887	20,485	134	15.6
No treatment w/wildfire	2,000	1,408	1,192	15,514	86,800	714	42

Potential Effects from Greenhouse gases: carbon dioxide from Alternatives 1 and 2

The CO2 emissions from burning for Alternative 1 are displayed in Table 6. The emissions from these planned activities must be compared against the CO2 emissions that could occur with an unplanned wildfire, which, as Safford et al. (2012) conclude, is more likely to occur under Alternative 2. Table 6 above also presents potential emissions from wildfire. A synthesis study by Safford et al. (2012) showed

that tree mortality rates in treated areas that burned in wildfire were generally much lower than in neighboring untreated forest (mean of 22% vs. 73%). Thus, completed treatments notably sustained a forest's ability to continue to sequester carbon, a result consistent with modeling and post-fire assessments of forest carbon (Hurteau and North, 2010; North and Hurteau, 2011). Moreover, less tree carbon loss following wildfire must be viewed in the context of the carbon sequestered from biomass and saw timber removal in treated areas before they encountered fire. The ultimate use of that removed biomass results in relatively long-term sequestration in building materials, and biomass burning for energy which supplants fossil fuels.

Mixed conifer and yellow pine (eastside pine type) forests in California supported tremendous amounts of fire before the arrival of Euroamerican settlers (Sugihara et al., 2006; Stephens et al., 2007; van de Water and Safford, 2011). Although most of that fire is generally understood to have been of lower severity, such a relationship with fire – especially when combined with projected increases in the inertia for fire as climates continue to warm – suggests that these forest types should not be focus areas for grand schemes to increase US carbon sequestration rates. Rather, in these forest types it makes sense to focus on management practices that restore fire- and drought-resilient forest structures that are more likely to retain tree carbon through recurrent fire (and other disturbance) cycles (Hurteau and North, 2009). Such practices, which focus on the recruitment and retention of large, fire-tolerant trees, include forest thinning of smaller individuals of more fire-sensitive species (with the removed biomass used wisely), prescribed burning, and an expansion of the use of naturally-ignited wildfire.

Summary of Effects and Conclusions

The project meets the Tahoe National Forest Land and Resource Management Plan forest wide standards and guidelines for air quality as well as local and state regulations including, California Code of Regulations, Title 17. Below is a table describing the conformity analysis in tons of emissions produced per year distributed over 5 years except for jackpot/underburn which would likely take place over 10 years or more.

Table 7: Conformity Analysis for emissions produced per year

	Alternative 1	NOx	PM10
Threshold for significance		25	100
Mobile Emissions (5 years)	Alt. 1	2.98	.008
Grapple Pile/Burn (5 years)	Alt. 1	5	17.6
Hand Pile/Burn (5 years)	Alt. 1	.09	0.35
Jackpot/Underburn (10 years)	Alt. 1	1.56	25.3
Annual Emissions Less Than Threshold	Alt. 1	Yes	Yes
Project Conforms with the Clean Air Act	Alt. 1	Yes	Yes

The proposed action will produce emissions and temporarily impact air quality. Prescribed fire emissions can be mitigated by burning when atmospheric conditions are conducive to the transport and dispersion of smoke. There will be a short term cumulative impact to air quality if several prescribed burns are occurring in an air basin at the same time. There will be reduced impacts to air quality when future

wildfires burn in units where activity fuels are treated due to lower emissions a result of decreased fuel loading. In the absence of maintenance treatments, fuels will increase along with the potential for increased particulate output in the advent of wildfire. The action alternatives would be done in a controlled environment, where a wildfire would not. This project conforms to all national regional and local rules and regulations.

Conclusions

The BJE Project has been determined to conform to the Clean Air Act and the State Implementation Plan (SIP). All the predicted emissions are less than the General Conformity thresholds. Prescribed fire smoke emissions, and similar activities like pile burning, are included in an approved Smoke Management Program (SMP) and are therefore presumed to conform to the SIP. On the basis of the foregoing, it is my determination that I have considered the best available science relevant to the effect of this project to the air resources of the Tahoe National Forest.

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